The MAC Flyer

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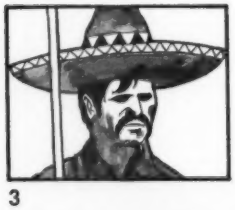
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Incident at Wolf Creek Pass

The forecast was for hot and dusty, and this time the forecasters were right.

by Lt Col Robert S. Michelsen
129 ARRG
Hayward Air Terminal, Calif.

Pedro Ramirez snapped awake. Lying in his bunk in the covered trailer, he listened to the sounds of the early morning. In his mind he went over the coming events of this special day. Today they would move the sheep from the mountain to the low pasture.

They had worked the high plateau for three months and had lost only seven sheep. This would be the best ever in Pedro's 23 years of sheep herding. This summer had been good, but more important, it was his last.

The boy learned quickly — he would be ready to take on next year's work by himself. Only one thing was left to be done, one final critical thing: select a safe, secure route off the mountain. And choosing the wrong one could mean losing sheep.

The route over Timberline Lake down through the rocks was good but long, longer than through Wolf Creek Pass. The pass was usually best, but sometimes, after a hot dry summer, it could be very dusty. He thought about the helicopters from the local base. They sometimes landed there; that would surely excite the sheep. And with the swift creek churning through the narrow pass, that could be disastrous.

It was time. Pedro rose quickly and began preparing his favorite breakfast — strong coffee and biscuits. He and the boy made small talk as they breakfasted near the dying fire. Afterwards, they walked around the closed trailer, checking to be sure it was tightly secured and ready for towing down the mountain. Hank would take care of that later with the big ranch truck.

They squatted down and be-

Honorable Mention 1975 MAC Flying Safety Writing Contest

Wolf Creek Pass

gan discussing routes. The boy seemed attentive as Pedro drew lines in the dirt with a stick, pointing out the routes and discussing the pros and cons of each. As Pedro talked, he sensed the boy's eagerness to get off the mountain, away from the sheep, and have a night in the town.

Then it was done, the decision made. Pedro stood up, "Wolf Creek Pass it is." And the boy ran to start the sheep on their way. Pedro realized that he, too, was eager to get off the mountain. Even while they had been discussing the route, his mind had wandered — to retirement and of staying at the ranch, helping only with the shearing each spring. He was anxious to put the mountain behind him.

* * *

It was supposed to be a routine training mission. But the student was ready for a "toughie." That's why I decided to use the high altitude site at Wolf Creek Pass. I mean, this was his last remote training ride before his flight check. If the check pilot asked him to land at Wolf Creek Pass and he botched it, that would reflect on me — not adequate training and all that.

Anyhow, the site was not that difficult. It was hot, but we could just make the ten percent power reserve required for a five-foot hover.

We were about 15 minutes from the site and the second lieutenant had started his preliminary planning. I listened to him work through the critical power calculations. That's good, I thought; we can just make it. And I'd be able to get back early and start processing with the CBPO types this afternoon.

The lieutenant eased the big helicopter into a gentle descent.

I had a lot to accomplish in the next few weeks before signing out. Did I make that appointment with housing to pick up my stuff on the 24th? Gotta make sure.

Umm. Smell the dust in the air.

* * *

The first few miles had been easy. The herders and the sheep were well acquainted by now. But as they neared the pass, Pedro felt a bit apprehensive. Before, he had just been trudging along, thinking about those years ahead; he had earned his retirement. Then something caught his eye.

He was suddenly aware that the dust was rising higher and

higher. Now, the sheep called nervously and started to bunch and run in short spurts. Some tried to turn back. The dog was running frantically trying to keep the formation together.

Just then, Pedro saw it. A lone helicopter just above the ridge. Pedro could barely hear its distinctive whine.

Muttering a prayer, he ran toward the sheep, calling to the boy and shouting for the dog.

* * *

I saw the cloud of dust and guessed the reason. But the sheep would be out of there by the time we finished our site recons.

The dust looked bad as it hung in the calm, dry air. We'd come this far; it would be a waste not to try it.

As the young pilot started his orbits, I saw the last of the sheep leave the pass. They were clear when we began our approach.

* * *

The noise was too much for the already excited sheep. As they fought to get clear of the pass, those on the creek side were forced over the steep ledge. Pedro counted ten go, then five more. The cries of the injured sheep panicked the others even more.

* * *

The lieutenant brought the helicopter into a hover slightly short of the intended landing area — a common mistake for students. For some reason they just hate to lose sight of the spot where they intended to put it down. I was just about to comment on this aspect of remote landings when the dust began to rise.

It swirled up from behind, churning through the rotors, then down and up through the whirling blades again.

"I've got it!" I shouted, grabbing the controls. Looking, searching for an outside reference. Something had to be done — full power and ease it out of there — or find a rock, tree, shrub, anything on the ground for reference, and set it down.

If I had just had more power — rip it in there — get up higher, out of our man-made dust storm. But five feet was it. Any higher and we would lose our precious ground cushion and rotor speed would drop off. We'd fall like a rock — into what? I couldn't see anything.

How had I let that happen? I'd just been sitting there, I let it get away. I knew we had to watch for dust. I'd seen it before, but nothing like this!

Power would be best. Ease it forward and out of there. Easy! Easy! Then the terrible crunching, grinding sound — the stick slapping around inside the cockpit. Set it down! Set it down! Engines off, rotor brake on, battery off.

* * *

We were bouncing down the road in a dusty Air Force-blue pickup. The flight engineer and one lieutenant were in the back; the driver, the other pilot, and me in the front. It was hot and dusty and I felt miserable. No one said anything; it was going to be a long drive back to the base.

Up ahead, there was a man and a boy. Further ahead, sheep covered the hillside and the road. A dog ran off to the right, gathering in a few strays.

As the driver turned the truck sharply around a switchback, I saw the helicopter silhouetted on the ridge high above, the tail embedded in a tall scraggy oak — the only tree within a hundred yards.

I stared at the backs of the two herders up ahead. What a life. No problems, few responsibilities, being your own boss.

As we passed, I stared into the old man's eyes. That was odd. I saw in his eyes the same sickness and misery that I felt.

ABOUT THE AUTHOR

Colonel Michelsen attended the University of Washington and Central Washington State University. He received his B.S. degree in 1957 and was commissioned through ROTC. Colonel Michelsen earned his pilot's wings in 1959. He has served with ARRS in helicopters at McChord AFB, Wash.; Danang AB, RVN; Vance AFB, Okla.; Wheelus AB, Libya; RAF Woodbridge, United Kingdom; Ramstein AB, Germany; and Hill AFB, Utah. Colonel Michelsen is presently Helicopter Pilot Advisor to the California ANG, Hayward Air Terminal, Calif.

Mishaps with a Moral

Distractions during critical phases of flight can be terribly unforgiving. Consider the crew of a jumbo jet who became distracted while trying to solve a landing gear malfunction a few years ago. Every crew member on the flight deck was so concerned with the malfunction that no one monitored the aircraft altitude. A nocturnal swamp claimed its prize and many victims.

More than 80 percent of all aircraft accidents occur within the takeoff or landing phase of flight — when crew workload is heaviest. In each of these phases, an aircraft enters a critical flight regime that requires the most in crew concentration. Landing and takeoff transitions require optimum attention to the tasks of safely guiding and controlling the aircraft. Yet, in spite of these demands, a crew occasionally bypasses procedure and becomes a statistic. Here are accounts of two accidents in which this occurred.

Casual Cockpit

A DC-9 departed South Carolina for the Great Lakes region with an intermediate stop in North Carolina. The first officer flew the aircraft while the captain handled aircraft communications and checklist items. Less than a half hour after takeoff, the airliner approached its only en route stop. ATIS broadcast for the airport, monitored by the crew, reported a partially obscured sky with estimated broken decks at 4,000 and 12,000 feet. Visibility was one and one-half miles in ground fog, winds 360 degrees at five knots, and VOR 36 approach was in use.

Center cleared the flight to contact approach control and seconds later approach control gave vectors to the VOR final approach course. Six miles south of the final approach fix, approach control cleared the flight for a straight-in approach. Two minutes later the captain announced to his copilot, "There's the final approach fix. Now we can go down."

Tower cleared the flight to land and the aircraft continued its approach. Approximately three miles short of the runway, it plowed into the ground and burned. Seventy-one of the 82 occupants died.

Taped communications with air traffic control gave no hint of what led to the disaster, but aircraft cockpit voice and data recorders told a different story. Voice recorder tapes showed that for about 15 minutes prior to the crash the pilots had engaged in intermittent conversations not related to the operation of the aircraft. The conversations covered a number of topics — from politics to used cars — and both pilots expressed strong opinions and aggravation concerning the subjects discussed. Investigators believe that these conversations were distractive and reflected a casual mood and lax cockpit atmosphere which continued throughout the approach. At one point the pilots commenced a lengthy discussion about a lighted tower in an amusement park near the final approach course. While both pilots gazed ahead at the tower, apparently neither detected that the aircraft was descending. During their discussion about the tower the terrain alert warning sounded, signifying that the aircraft had passed through 1,000 AGL. In spite of the warning, the descent continued. Still, there was one more opportunity to get it back together.

The aircraft flew over the final approach fix at 1,350 feet MSL instead of the minimum 1,800 feet MSL. Airspeed traces showed the DC-9 crossing the final approach fix 46 knots higher than recommended approach speed. These errors might have been detected had the captain, performing copilot duties, made the company-required "altitude above airport" and airspeed callouts. Not only did he not make these calls, but he also failed to call upon reaching 500 feet above the airport and 100 feet above minimum descent altitude.

Investigators were unable to pinpoint the precise cause of the almost total lack of altitude awareness on the part of the crew. But several possibilities were considered. One suggests that because of the extended duration of flight above a low, patchy fog bank with intermittent ground contact, the crew may have relaxed their instrument scan and relied more heavily upon visual cues to fly the approach. Another possibility centers around the interrelation-

Neither pilot realized that the aircraft was descending

ship between two different altitude displays in the cockpit. In accordance with the company's procedure, when an aircraft approaches a terminal approach area, the primary altimeters for both crew positions are changed to QFE (to indicate height above the field) settings, while an alternate altimeter on the captain's side displays QNH. When the DC-9 approached the final approach fix, the captain briefed the final approach fix crossing altitude as 1,800 feet (MSL) rather than the QFE altitude of 1,074. Investigators pointed out that the first officer may have accepted the 1,800 QNH figure as the QFE "above the airport" figure without cross-referencing his own approach plate. This, in turn, may have led the first officer into misreading his own altimeter.

One federal investigator stated, "The overall lack of discipline was manifested in a number of respects where the flight crew failed to adhere to recommended or required procedures."

Although MAC approach procedures and policies may differ from airline operations, the moral here focuses on the need to comply faithfully with the intent and letter of operational procedures and requirements. Running a loose ship could eventually lead to another mishap's being added to those on these pages.

Adapted from
National Transportation Safety Board
Report Number NTSB-AAR-75-9

Deliberate Deviation

Light snow was falling as a twin-engine turboprop neared its destination. The flight service station at the field reported a variable ceiling between 200 and 400 feet and two miles visibility in light snow and fog.

After passing the locator inbound on a localizer-only approach, the crew reported runway lights in sight and minutes later requested they be dimmed. The airline ramp agent awaited the arrival of the turboprop and became concerned when it had failed to land long after its scheduled arrival time. Attempts to contact the flight failed, so the agent began searching the field. He drove his vehicle to the approach end of runway 33, where he saw a man who told him that an airplane had crashed on an embankment near the runway.

Police and rescue personnel were immediately notified, and they quickly rushed to the scene of the crash. They found five survivors: four of the 15 passengers and the first officer.

Hazy Recollections

During the investigation, the first officer said that after passing the outer marker inbound to the runway, the aircraft descended at a rate of 300 to 400 feet per minute and was below the bases of the clouds between 2,900 and 3,000 feet. He recalled having seen the approach lights at three to four miles out and asking flight service to turn the intensity down less than a mile from the runway. After the lights were dimmed, he said, he completed the landing checklists and called 100 feet above field elevation. At that time, he recalled, the airspeed was 115 to 120 knots. He said he felt the aircraft suddenly sink and instinctively reached for the throttles. The captain had already advanced them. He said he had felt the control column move aft and believed the aircraft was in a nose-high attitude. His next recollection was of being on the ground outside the aircraft.

The Investigation

Accident investigators determined that the captain was aware that the ceiling was reported as nearly 400 feet below the minimum descent altitude for the localizer-only approach; however, the visibility was well in excess of the required minimum of one-half mile, and the captain could legally

have initiated the approach based on visibility. But he was restricted by FAA regulations from descending below the MDA until the approach lights, approach threshold, or other identifiable portions of the runway environment were in sight.

Since at the time of the accident the ceiling was reported to be nearly 400 feet below the localizer MDA, investigators focused their attention on the question of why the captain elected to continue the approach down through minimums. According to the first officer, ceiling was higher between the compass locator and the airport — the point of measurement.

Analysis of the first officer's statements suggests that the captain deliberately descended well below MDA in instrument meteorological conditions. The compass locator is perched on a ridge approximately 400 to 600 feet higher than the airport. Consequently, investigators felt, there would have been an up-slope flow of moist air which could have produced lower ceilings than those reported between the compass locator and the airport.

About three minutes elapsed between the first officer's reported sighting of the approach lights and his subsequent request to dim the lights. During this time, the aircraft would normally have covered about five miles. Had the first officer actually made the request when the aircraft was about three-fourths of a mile from the threshold, as he stated, the aircraft's position would have been closer to the compass locator when he reported the lights in sight. Therefore, had the captain adhered to the published crossing altitude at the compass locator and descended at a normal rate, which according to the first officer he did, the aircraft would have been about 5.76 miles from the threshold at 1,800 feet above the airport elevation when the "lights in sight" call was made, rather than three to four miles and at 600 to 700 feet, as stated by the first officer.

Investigators believe that weather conditions similar to those at the airport most likely existed between the compass locator and the airport. They determined that the probable cause of this accident was a premature descent below a safe approach slope followed by a stall and loss of aircraft control. The reason for the premature descent could not be conclusively determined but investigators felt it likely that the captain deliberately descended below the published MDA to establish a visual reference with runway environment. Other possible factors contributing to the accident are visual impairment or optical illusions created by the runway and approach lighting systems. Wind shear or downdrafts may also have contributed.

Adapted from National Transportation Safety Board Report Number NTSB-AAR-75-3

Inertial Navigation Means Help Is on the Way

The ancient art of navigation is not dying, but the navigator's triangle is being replaced by an orthoganol triad.

For many old head navigators, their first oceanic crossing in the brand new C-141 proved to be somewhat of an ordeal. Even those who were highly talented in the ways of sextants and dividers experienced problems that were difficult to associate with MAC's newest airlifter.

Little wonder. The nav gear on the new Starlifter in those early days was such that MAC required its crews to pencil in "Minimum nav aids" in the remarks section of many overwater ICAO flight plans.

Things are better now, although the nav equipment on the C-141 still does not do justice to its multimillion dollar platform. But the days of not-so-certain position in the C-141 may be numbered. A feasibility study on Improved Navigations Systems for the C-141 has laid the groundwork for Inertial Navigation Systems in MAC's Starlifter fleet.

Tests were conducted by the 437 MAW, Charleston AFB, S.C., to evaluate an off-the-shelf commercial navigation gear for possible use, and the model chosen for further evaluation is the Delco Carousel IV-E Inertial Navigation System. During initial tests this piece of equipment registered an average error rate of .66 miles per hour of flight, or a total of 5.3 miles on a typical eight-hour flight. Pilots found the Carousel easy to operate and the maintenance factor was low — one failure in 252 hours of flight.

If all goes well during subsequent tests — and Congress willing — the C-141 fleet could be equipped with dual inertial by mid-1978. Since the dual system will allow the C-141 to fly some overwater routes navigatorless, this could mean a reduction in MAC navigator authorizations. It will definitely mean that Starlifter pilots will have to learn to operate the INS.

To get the true picture of just how far the state of the art has progressed, just look back ten years or so at the nav panel on the C-141. Positioning equipment consisted of the old reliable D-1 sextant, an accurate watch, questionable doppler, and an associated cross track along track computer, the ASN 24, and a compass system which insisted upon switching from Mag to DG operation for no apparent reason. Of course, there was the Loran receiver — with its perpetually flashing red lights. Not very modern equipment, considering the sophisticated aircraft that depended upon it.

The physical appearance of the Starlifter nav station hasn't changed much during the ten-plus years since its infancy, although many of the kinks in the navigation gear have been ironed out. But the comfort index for today's C-141 crews who still must penetrate ADIZ's or maintain course on a NAT Track, still leaves much to be desired.

Most Probable Position

Many navigators would rather not tell some of the "war stories" they have accumulated while navigating the C-141. But in 1973 a program dubbed "Oprep Three" (Oceanic Navigational Error Reporting) brought many such stories to light.

With air traffic density over oceanic routes approaching saturation under our former separation standards, it became obvious that new separation criteria were needed. The old standard of 2,000 feet altitude separation from opposing traffic and "correct to course within 200 n.m."

Inertial

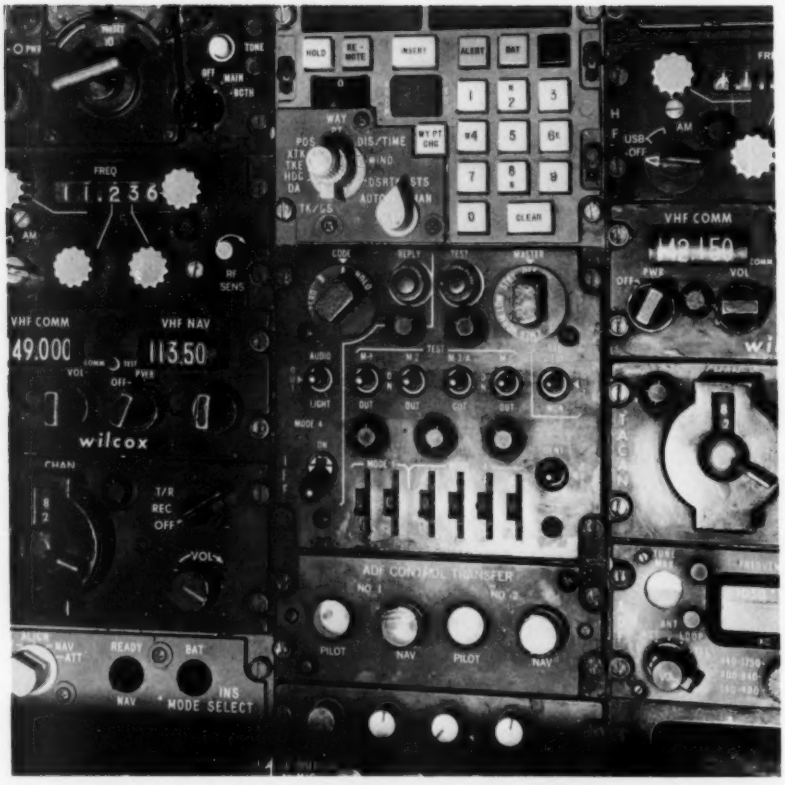
just wouldn't suffice for the North Atlantic stampede of commercial and military aircraft. The proposed standard was to be 1,000 feet altitude and 60 n.m. lateral separation for opposing traffic. But before standards could be changed, the problems that were being experienced in overwater navigation needed airing. This was accomplished by "Oprep Three," which succeeded in documenting the C-141's need for better navigation equipment. The general conclusion was that the gross navigational error rate for C-141's, which approximates one-tenth of one percent, is a credit more to MAC navigators than to the equipment they are using.

The Inertial Navigation System should solve the problems of coriolis, precession, nutation, and grivation, thus answering a decade of prayers from C-141 navigators.

Some INS Features

Totally independent of any outside aids, the computerized Magellan uses a triad of accelerometers mounted perpendicularly to each other. Each accelerometer consists of a pendulously mounted sensor that measures acceleration on its aligned axis (vertical, horizontal, and longitudinal). The triad, mounted on a gyro-stabilized platform, measures changes in velocity on all planes.

The system computes velocity, distance, and true heading; has an updating and automatic alignment correction capability; can store data from nine way points (checkpoints) and nine tacan stations; and has a grid function.



Approximate location of the INS control on the pilot's center console.

A feature which should be welcome by all crew members is that complete electrical failure on the aircraft will not knock out the system — not for a while, anyway. This is due to a 27-volt nickel cadmium battery which, in the event of power failure or interruption, powers the system — for about 30 minutes.

To the untrained eye, MAC's version of the Carousel looks exactly like that one being used by many airlines. But not so. There's one big addition to the MAC version — an "airdrop" mode. Yep, they thought of everything. And, as an example of its simplicity, the calibration and alignment process of the Carousel takes approximately 17 minutes, compared to about 26 minutes for the IDNE on the C-5.

Many airlines employ the inertial navigation system at the expense of navigators, and the need for MAC navigators obviously will dwindle once the equipment is installed on C-141's. Just how much of a reduction in navigator manning will be necessary has not been determined.

But don't throw away your dividers yet, navigators. There's still a lot of ocean to cross before the INS transforms your aircraft commander into a computer-aided Magellan.

Are Biorhythms a Waste of Time?

by Maj John H. Wolcott, USAF, BSC, Aerospace Pathology Division, Armed Forces Institute of Pathology, Washington, D. C.

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Can the biorhythm theory reasonably be adapted to flying safety or is it just a cop out for poor performance? The following article delves deeply into a reservoir of information in a new appraisal of the theory. The views presented here first appeared in the November 1975 issue of TAC ATTACK, and they are not official nor do they necessarily reflect the views of the DOD, Air Force, Army, National Transportation Safety Board, or THE MAC FLYER.

What is the "biorhythm theory," and how does it apply to aviation safety? Recent military magazines as well as other popular literature suggests a role for biorhythms in reducing accident rates. The biorhythm theory proposes that there are three biological cycles which affect a person's feelings and performance. The 23-day physical cycle and the 28-day emotional cycle were discovered by Swoboda and Fliess, working independently, over 70 years ago. Later, Teltscher discovered the third cycle, a 33-day intellectual cycle. The cycles, represented by sine wave curves, start simultaneously on the first positive half-cycle at the moment of birth. The positive phase of each cycle represents a period when maximum performance should be expected, the negative phase represents periods of poorer performance, and the crossover points of the cycles (sine nodes) are termed "critical periods." Critical periods are characterized by maximum fluctuations in aspects of behavior and represent times when accidents are most likely to occur. (See Figure 1.) Detailed description of the biorhythm theory can be found in Thommen's book (1973). Major Tim Brady, then Editor of *Tac Attack*, in a March 1972 article, also summarized the essential points of the theory.

The biorhythm theory is frequently used to predict individual capabilities — physical, emotional, and intellectual — during past, present, and future time periods. If a person's date of birth is known, it is easy to test the theory to see if past accidents correspond with points on the biorhythm curves. To do this, however, it is essential to understand the mathematics of the theory and the effect of different lengths

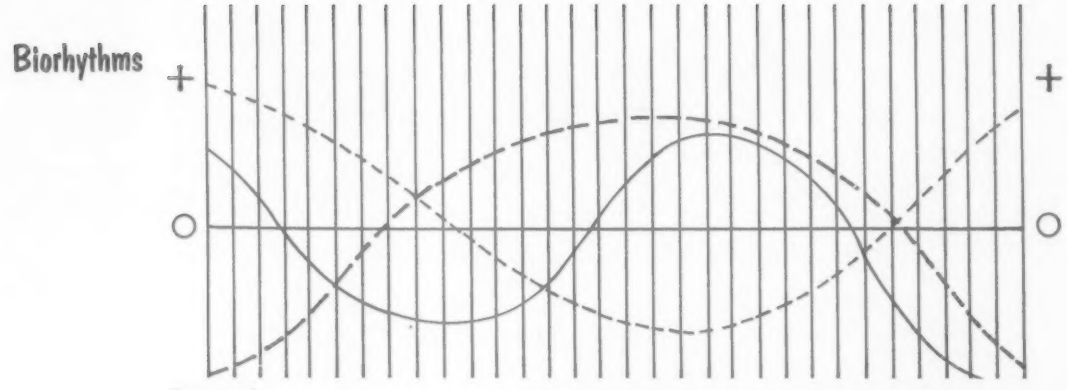

Figure 1

of time used for the critical period.

Most people who have calculated biorhythms have defined each critical period to be of 24 hours' duration. Since a sine curve is composed of both a positive and a negative phase, the line crosses the "zero line" twice each cycle. Each of these nodal points represents a critical period. Therefore, two of 23 days are in the physical, two of 28 days are in the emotional, and two of 33 days are in the intellectual "high risk" periods. Adding these figures would yield a total of 21.9 percent which is reduced to 20.4 percent because of the occurrence of multiple critical days.

Double and triple critical days refer to days when two or three rhythm curves cross the "zero line" at the same time. The exact percentages of all days that are critical if a 24-hour critical period is used are presented in Table 1.

Using a 48-hour or 72-hour critical period would increase the expected random occurrence of critical days from 20.4 percent for the 24-hour critical period to 37.8 percent and 51.5 percent, respectively. These percentages do not exactly double and triple because large increases occur in the number of multiple critical days. It is essential that these percentages be understood and the length of the critical period be clearly defined when evaluation of past accident data is undertaken by means of the biorhythm theory.

Previous studies that applied the biorhythm theory to aviation accident data indicated that accident rates might be reduced if each pilot were briefed on his biorhythm potential. Thommen (1973) reported that, in a limited study conducted by Mr. Woodham of the Guggenheim Aviation Safety Center, 80 percent of the accidents occurred when one or more of the pilots was in a critical period.

Major Brady reported that 13 of 59 TAC accidents (12 expected from random calculation) occurred on days when one or more of the pilots involved was in a biorhythmically critical period. He also noted that 67 percent (55 percent expected) of the accidents occurred on days when two or more cycles were in their low phase. Weaver (1974) sampled one-fourth of the U. S. Army pilot-error accidents that occurred during a two and a half year period and reported that 49 percent occurred on critical days of the pilots. Sixty-four percent of these were on double-critical days. Most recently, Williamson (1975) reported that of the 24 MAC accidents for which complete data were available, 58 percent occurred on a critical day of the pilot. He also evaluated 35 cases from ADC and found only a 34 percent correlation between the occurrence of accidents and their occurrence on biorhythmically critical days. It must be pointed out that the author used one day on either side of the critical period as the critical day and thus increased the expected occurrence of critical days to 51.5 percent. By application of his figures, it appears that 26 of 59 cases (only 44 percent) occurred on critical days of the pilots.

In reviewing the above data, the sample sizes were small or not reported, the length of the critical period was not always 24 hours and not always defined, and statistical testing was nonexistent. From Table 1 it can be seen that the probability of a double-critical day occurring on any given day varies from 0.4 to 0.6 percent and that triple-critical days occur only four times in 10,000. It is evident, therefore, that to test the theory adequately on accident statistics, it is essential to use a large sample size. This is particularly true when observed data do not deviate much from random expected results.

Sacher (1974), in his master's thesis, studied over 4,300 U. S. Navy aircraft-accident cases and found no significant deviation from random expected results. Some of his data will be referenced later in conjunction with nearly 4,300 pilot-involved cases reported here.

We used the U. S. Army Aviation Safety Center accident data on file at the Armed Forces Institute of Pathology to calculate more than 600 biorhythms. It was decided that this sample size was limited, and another 4,003 cases were obtained from the National Transportation Safety Board (NTSB) for general aviation accidents occurring in 1972. Finally, another 1,200 cases were obtained from the U. S. Army Aviation Center, Fort Rucker, Alabama. From these two sources, there were 5,840 aircraft-accident cases (1,837 U. S. Army and 4,003 NTSB), of which 4,279 had been classified as pilot-involved.

In calculating the biorhythms of pilots, the average birth time of 1200 hours was used since exact time of birth was not available in either NTSB or U. S. Army files. This practice has been used by most biorhythm proponents when calculating biorhythms for large sample sizes. The data were also screened by using a 48-hour critical period in order to insure that this assumption of an average time of birth did not unduly influence the testing of the theory.

Data were tested by the chi-square statistical test. This involves finding the difference between the expected and observed events, squaring this difference, and dividing by the expected number. The chi-square test is used to test data when the expected number occurring can be calculated based on theory. In this case, the random expected numbers of accidents occurring can be calculated by using the percentages shown in Table 1. A chi-square is calculated for each type of critical day (single, double, or triple), and a total chi-square is then derived. This total chi-square value is compared to a statistical table at a specific significance level to see whether the results deviated from the expected random model. In this study, a significance of 90 percent ($p = 0.1$) was used to test the biorhythm theory. If a result is not statistically significant by this test (observed chi-square value less than the tabular value), it refers to a frequency that might reasonably be expected to have occurred by chance alone.

The data presented in Table 2 were derived from the 3,253 pilot-involved accident cases recorded by NTSB for general aviation in 1972. It summarizes the distribution of accidents with respect to their occurrence on noncritical and on various type of critical days. There were a few more accidents occurring on single-critical days of the intellectual days of the intellectual cycle and on double-critical days of the physical-intellectual cycles than expected. Despite these variations, the total chi-square was not statistically significant.

Addition of the data presented in Table 2 to exactly the same type of data derived from evaluation of the 1,026 pilot-involved accident cases of the U. S. Army yielded the results presented in Table 3 for 4,279 accidents. There were still a few more accidents occurring on critical days of the intellectual cycle than expected. There were also few more than expected occurring on critical days of the emotional cycle. The total chi-square was slightly lower than the previous value and was also not statistically significant.

Again, using the 24-hour critical period and considering all three cycles, the resultant total chi-square value was even less when the data of Sacher (1974) were added to those for U. S. Army and NTSB cases, making a total of 8,625 cases. Although there were still a few more acci-

dents occurring on single-critical days of the emotional and intellectual cycles than expected, numbers of most multiple days. The data *did not deviate significantly from the random model.*

If the biorhythm theory is correct, in addition to expecting higher accident rates on critical days, it is also reasonable to predict that more accidents would occur on negative or poor-performance portions of the cycles, particularly when more than one biorhythm curve is in a negative phase. Data from 4,279 pilot-involved cases (U. S. Army and NTSB) showed the number of accidents that occurred when three cycles were positive, two cycles positive and one negative, one positive and two negative, and all three negative. *Accidents did not occur on triple-negative days with greater frequency than expected.* Again, the observed events so closely matched the expected that an extremely low chi-square resulted.

Data from the U. S. Army and the NTSB were also analyzed in several ways not presented here in tabular form. First, since an average birth time of 1200 hours was used, the data were also evaluated using a 48-hour critical period. This would pick up any "close hits" — that is, pilots whose birthdays were early in the morning or late at night. The appropriate expected percentage, however, must be changed to reflect the 48-hour period. *The deviations which occurred from the predicted / expected values were not statistically significant.*

The data were also analyzed with reference only to the physical and emotional cycles, since many proponents of the biorhythm theory believe these to be the two important cycles in determining the occurrence of accidents. These cycles were evaluated for critical periods of both 24 hours and 48 hours. *No statistically significant differences occurred from the expected results.*

The occurrence of accidents in relation to the phase of cycle was also investigated in several different ways. The number of accidents that occurred on the positive or negative phase of each cycle was recorded. The data were also analyzed with reference only to the physical and emotional cycles and the combined state of the cycles recorded (two positive, one positive-one negative, or both negative). Finally, the data were analyzed to see whether more accidents than expected occurred on peak negative days of the cycle (maximum low points). *Only very small deviations occurred, and none were significant.*

The various methods of studying the data mentioned above resulted in the construction of eight chi-square tables from each data source (U. S. Army, NTSB, and both combined). Only three of these 24 tabular total chi-square values were significant at the $p = 0.1$ level. All three of these were on the smallest sample size, the U. S. Army. All three resulted from distributions of critical days that did not match the theoretical expected distribution, but nevertheless did little to enhance the biorhythm theory. The first two deviations were discovered while analyzing the distribution of critical days among all three cycles for 24 and 48 hour critical periods. In both cases, there were individual chi-square values that resulted from fewer than expected numbers of accidents occurring on specific critical days and that composed about half of the total chi-square value. The third significant total chi-square value resulted when evaluating only the physical and emotional cycles while using a 48-hour critical period. Again, there were fewer than expected numbers of one type (double-critical-day) and more than expected numbers of single-critical-day accidents.

Table 1

Critical Day	24-Hour Period	48-Hour Period
Single period	7.5850	13.0999
Single emotional	6.1265	10.3707
Single intellectual	5.1383	8.5827
Double P/E	0.5835	2.1834
Double P/I	0.4894	1.8069
Double E/I	0.3953	1.4305
Triple P/E/I	0.0376	0.3011
Total critical	20.3557	37.7752
Noncritical	79.6443	62.2248

Expected Percentage Occurrence of Critical Days Physical (P), Emotional (E), and Intellectual (I) Cycles

Summary and Conclusions

Previous reports have claimed that a person is as much as three to eight times more susceptible to accidents during a critical period. Analysis of 8,625 cases for correlation of aircraft-accident occurrences on critical days and 4,279 cases for correlation with negative phases of cycle failed to demonstrate that aircraft accidents occur in accordance with the biorhythm theory. *The total*

percentage of accidents that occurred on all types of critical days was 20.78 percent, compared to the expected ratio of 20.36 percent. This deviation which occurred from the expected results was not significant. Additionally, an extremely low chi-square value was obtained when comparing the occurrence of accidents on various multiple phases of cycles. Although average birth times were used and aircraft accidents are difficult to assess absolutely with respect to cause, the use of a large sample size, without significant deviations from expected results, rules out biorhythms as a causal factor in aircraft accidents.

Careful scrutiny of other biorhythm data is needed. The fact that industrial-accident rates were reduced by briefing workers on biorhythms may simply have resulted from people exercising more care as a result of individual attention from management. Practicing care on critical days and on one day on each side of the critical day results in exercising care over 50 percent of the time. One would expect accident rates to decline when increased care is taken to follow safety precautions or when hazardous situations are avoided, as is the goal of any accident-prevention program.

It obviously makes sense to be careful when flying, particularly if it is on a seemingly "bad day," which everyone has from time to time. Predicting the occurrence of these bad days by use of the biorhythm theory is, at best, questionable. *Using biorhythms as an excuse for poor performance makes no sense.* The emphasis should simply be on common sense flight safety — not on calculation of individual biorhythms.

Table 2

National Transportation Safety Board Cases

Comparison of Observed and Expected Numbers of Critical-Day Accidents by Chi-Square Analysis in 3,253 Pilot-Involved Accident Cases

(Critical Period - 24 Hours)

Critical Days Type and Cycle	Observed Number	Expected Number	Difference (d)	Chi-Square d2 /Expt No
Noncritical	2557	2590.8	—33.8	0.42
Single physical	240	246.7	— 6.7	0.18
Single emotional	208	199.3	+ 8.7	0.38
Single intellectual	195	167.1	+27.9	4.66
Double P/E	15	19.0	— 4.0	0.84
Double P/I	23	15.9	+ 7.1	3.17
Double E/I	14	12.9	+ 1.1	0.09
Triple P/E/I	1	1.2	— 0.2	0.03
Total chi-square				9.79
Tabular chi-square, p = 0.1, n = 7				12.02

Table 3

National Transportation Safety Board and U. S. Army Cases Comparison of Observed and Expected Numbers of Critical-Day Accidents by Chi-Square Analysis in 4,279 Pilot-Involved Accident Cases

(Critical Period - 24 Hours)

Critical Days Type and Cycle	Observed Number	Expected Number	Difference (d)	Chi-Square d2 /Expt No
Noncritical	3364	3408.0	—44.0	0.57
Single physical	325	324.6	+ 0.4	0.00
Single emotional	288	262.2	+25.8	2.54
Single intellectual	236	219.9	+16.1	1.18
Double P/E	17	25.0	— 8.0	2.56
Double P/I	27	20.9	+ 6.1	1.78
Double E/I	20	16.9	+ 3.1	0.57
Triple P/E/I	2	1.5	+ 0.5	0.13
Total chi-square				9.33
Tabular chi-square, p = 0.1, n = 7				12.02

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— TAC ATTACK

An Audiovisual Appr

Deja vu is the feeling of
MAC's new program is c

"You ever been into Bango-Bango?" the AC asked his copilot.

"No, this is my first time," was the response.

"How about you, navigator?"

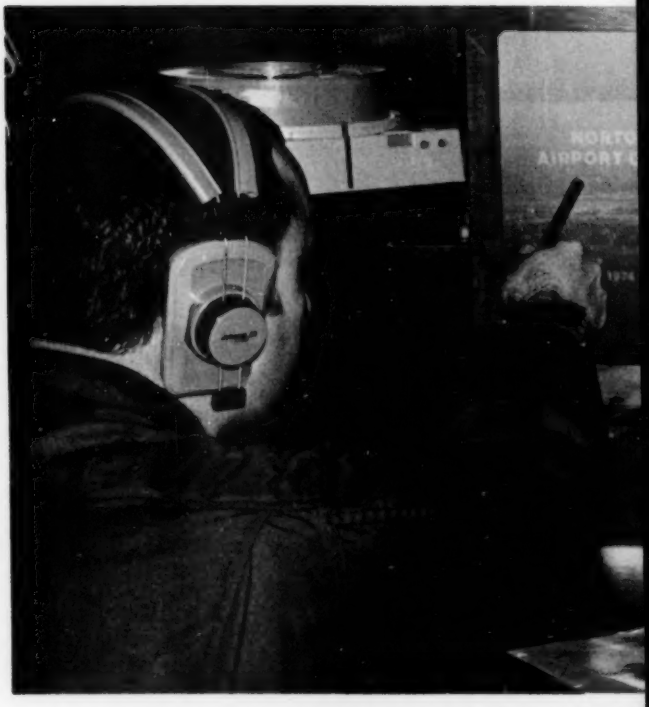
"Me, neither."

"Well, let's get out the letdowns and TPC's," the AC directed. "See if we can't figure out what the hell this place looks like."

Sound familiar? If you're a MAC pilot or navigator, chances are pretty good that you've played one of these characters in a similar scenario.

How many times have you made what you consider a no-sweat night landing at a strange airfield and then experienced a feeling of terror as the morning sunlight revealed jagged mountains on either side of your approach path.

Someday, experiences such as these may be only memories. And that someday may be in the *near* future — when MAC fully implements its Airport Qualification Program.



Associate editors Barbin and Brownfiel

Previews of Coming Attractions

Let's run another version of the scenario, as it might occur in 1977.

AC: "I see we're going to Bango-Bango this trip. Anybody been there before?"

Copilot and Nav (in unison): "No, Sir!"

AC: "Well, let's go over to wing ops and look at an audiovisual on it."

Copilot and Nav (in unison): "Good idea!"

For those who have participated in certain Instructional Systems Development programs (ISD), the Airport Qualification Audiovisual Program will not be an altogether foreign experience. The same "carrels" used for block training at your local "learning center" will be used for the new program. As you may know, the carrel is actually an audiovisual console complete with headsets and a small projection screen. A 35 mm slide presentation along with a regular cassette recording provides the words and music which will be used to educate you on the pitfalls of unique and unusual airports.

A Free Sample

Three air bases with significant terrain and/or traffic problems were selected for the initial evaluation of the audiovisual concept. The MAC Directorate of Training, with AAVS providing the audiovisual support, prepared sample programs on Norton, March, and George Air Force Bases. These bases were chosen on the basis of their having the broadest combination of problems such as frequent low

ach to Strange Fields

aving been there before.
signed with that in mind.

udying the Norton AFB audiovisual

visibility, high traffic density, and sharply rising terrain.

The length of each program will vary according to the number of problem areas and number of approaches and runways at the airport surveyed. The March AFB presentation runs about seven minutes. MAC hopes to refine each presentation to an average of five minutes.

Much of the program is still in the planning stage; 98 airfields world-wide have been identified for integration into the program. The big snag is the shortage of airframe flying time — to produce one package requires an AAVS team, a MAC crew, and between one and three hours of shooting approaches at the selected airdrome. AAVS personnel accompanied the MAC African Airfield Survey Team a few months ago, filming several airfields that will be used in the program.

All major MAC bases have learning centers, each equipped with a minimum of ten carrels. Units that do not have learning centers will be provided a portable system known as a "caramate." In any case, all MAC transport units will have presentations of hazardous airfields.

The learning center style was selected over the cartridge movies (Palace Flick) for a couple of reasons. The MAC trainers were interested in a "stop" or "hold" capability. This will give crew members time to study the letdown plates and terrain charts and compare them to the images on the screen. This added control also allows them to proceed with the briefing at their own pace.

Another reason for selecting the carrel method involves money. The slide-tape presentation can be reproduced at only a fraction of the cost of the cartridge motion picture.

Block Training

A typical MAC pilot or navigator can plan on receiving an initial qualification prior to checkout, with an annual refresher during block training.

The main thing is that the program will be available for study at any time and should enhance the confidence factor of crews, young and old, transiting strange and exotic places.

The 35 mm color slide and aural presentation is excellent and should give you that strange feeling of "having been here before" when arriving for the first time.

But the Airport Qualification Audiovisual Program is not a substitute for safety practices already used by pilots and navigators during letdown and approach. It's simply another aid, and an excellent one, to help you get the "big picture" of a strange airport that could cause you problems.

Twelve O'

The Air Staff has directed the formation of an ad hoc group to study the Air Force midair collision hazard. Heading the list of airfields with potential midair collision hazards is Pope AFB, N. C., and Little Rock AFB, Ark. Information on these airfields, along with other pertinent data, has been forwarded to the General Officer Panel on Midair Collision Potential at the Pentagon.

The ops officer spoke with a southern drawl, "And you know, men, it's awful hard to get hurt in an airplane if you don't hit the ground or another airplane."

It was a squadron safety meeting, circa 1963. The bright-eyed, bushy-tailed lieutenants might have considered this appraisal an oversimplification of the flight safety challenge. But the more one thought about it, the more sense it made.

The C-124's, Super Connies, and C-118's have been retired from the Air Force now. And in this age of IFF's, controlled airspace, and "radar contact" such quaint verbiage may seem a bit passé. And yet, most of us will find it as appropriate today as in those days of "meto power," "minimum en route," and "special VFR."

"Hitting the ground or another airplane . . ." is a double-edged sword, either side of which can kill. But a nagging problem is that many aviators tend to ignore the possibility of midair collision. The euphoria of Instrument Flight Rules and positive controlled airspace are partially responsible for this. But general aviation is growing dramatically, and, as if general aviation isn't doing enough toward filling the lower portion of the skies, sky divers, balloonists, crop dusters, and sail plane drivers are contributing their share. It is *crowded* up there.

Terminal

If you think that because you're a high flying jet pilot you're safe from the threat of a midair, think again. Yes, Virginia, airspace above flight level 180 is controlled, but the system for controlling it is not perfect. Besides, even C. R. Terror must come down sometime for food, water, and if nothing else, fuel. And landing at any airport means you must transit the often crowded lower levels.

An interesting fact is that most midairs occur within 25 miles of an airdrome. So it's just when you think you're home safe that you may be entering one of the most dangerous periods. Only a foolish pilot would allow a pair of eyes to rest on the crew bunk when they could add a definite measure of safety by scanning beyond the cockpit window. This is doubly important while running checklists and briefing for approaches. While the pilot's attention may be directed to activities inside the cockpit, another pair of eyes in the jump seat could keep you from tagging an aerial obstacle.

In 1975, MAC aircraft commanders reported 23 near-misses and who knows how many went unreported...

clock Low

Warning: The General Has Determined That Flight Below 10,000 Feet May Be Dangerous to Your Health.

Formation Flying Can Be Fun

There's no doubt that you see a lot more of the countryside at 500 AGL. And ripping along at 250 knots in amorphous formation tends to boost a pilot's ego. A handful of throttles, hand flying the airplane with your feet actually on the rudder pedals — if Mom could only see you now!

Warning! Return to reality. "One two, light aircraft at your twelve o'clock position!" Feather merchant! What's he doing at our altitude? Your altitude? Not necessarily. Though most VFR traffic operates between 1,500 and 12,000 feet, he's just as legal as you are.

"See and Avoid" is a philosophy sometimes difficult to employ, especially when your knuckles are white and your copilot is running the 20-minute warning checklist. So do your crew a favor and have as many eyes as possible scanning for traffic while at low level.

Strobes and PWS

The Air Force, FAA, and virtually everyone in the flying business is looking for a better way to prevent midair collisions. Being seen is important. If you happen to fly one of MAC's invisible C-130's (brown and green airdrop machine), you know that your custom paint job was designed to help you escape and evade around the countryside. Great for SEA, but not so good 20 miles north of Fort Bragg, North Carolina. In VMC conditions the new strobe lights will make your combat machine a little more visible. They're on the way, perhaps before the end of the year — and C-141's and C-130's are getting high priority because of their low level mission requirement.

Transponders give the ground controller a lot of latitude in working VFR traffic and he can give you some good advisories if he isn't too busy with IFR traffic. There's still no requirement for all aircraft to be IFF equipped, but transponders represent a growing capability in the quest for midair collision avoidance.

FAA is presently conducting an evaluation of a Proximity Warning System. It's still in the planning stage, but the PWS concept is similar to the Ground Proximity Warning System reported in THE MAC FLYER (December 1975). It provides the pilot a command signal whenever his aircraft is on a collision course with another.

In the Meantime

Help is on the way — and perhaps by the end of the century the midair collision problem will even be a thing of the past. But we aren't there yet. Meanwhile, collision avoidance must be the synergistic effort of all eyeballs on the flight deck.

by Maj Orlen L. Brownfield
Associate Editor

Ego Trip or Hidden Message?

If you thirst for adventure, eagerly accept challenges, and have an eye for the ladies, you could be a pilot headed for trouble.

by Maj Lowell A. Schuknecht
MAC/SGPA

This article emphasizes an aspect of your personality that you're probably aware of, but may not have considered for some time. It involves a line of research dealing with the psychological aspects of being an aviator. Some of the research used in its preparation is so current that only pilots (military jet and general aviation) have been studied so far. But don't dishearten, navs, engineers, and loads — your turn will come!

One method of determining an individual's personality traits entails a fascinating test known as the Edwards Personal Preference Schedule (EPPS). The most unusual aspect of this test is that the individual rates himself (i.e., you are the one who decides what your personality is really like). The test has high validity. For example, it is designed so that an examinee who is essentially a Mister Peepers type cannot succed in presenting himself as another John Wayne. Answering the questions the way "Duke" would could affect test results slightly, but that's about all.

The EPPS has been administered to several hundred military jet and general aviation pilots. The results confirmed that pilots actually live up to their popular image as courageous, romantic, "he-men." This may come as a surprise to some of their fellow crewmembers but the test results are clear.

Specifically, the EPPS showed that pilots rate higher than the average U. S. adult male in achievement, exhibition, dominance, change, and heterosexuality. This means that the pilot personality profile describes an active, masculine male; i.e., a man oriented toward demonstrating his strength and competency, who thrives on adventure, who finds pleasure in mastering complex tasks, and who has a strong desire for females!

Why is this significant? The answer is simple. Your strengths are also your weaknesses! The paradox is real, all right, for those very personality traits which contribute to your being a good pilot could also contribute to your becoming an accident statistic.

Here's how. The accident-prone personality has long been described as that of the quick, decisive, active, impulsive, independent, adventurous individual. Beginning to see the connection? "Psychological autopsies" were performed on a number of individuals who had died in accidents. From this, the Navy drew a hypothetical personality profile of the accident-prone aviator. Care to guess what they came up with? He has a strict moral upbringing which results in a strong drive for independence matched by an equally strong conscience. Pressure

from any source causes great anger and guilt. He is action-oriented and works off frustration by action, not words. His appearance in the eyes of others is very important; personal slight causes a sharp drop in self-esteem. He has recently assumed major new responsibilities.

Could it be that you see a little of yourself in that description? If so, does this mean you shouldn't fly? Of course not! It still takes a mistake to transform the *potential* for an accident into the *reality* of one. An act of commission or omission is required for the accident process to be completed. The most common "last acts" can be listed under one of a few broad categories: poor judgment, "get-home-itis," misconception, slips-of-the-hand, or inattention.

Consider the following personality profile. It is that of a high-achieving, action-oriented aviator.

Lieutenant Mike, a 25-year-old F-4 pilot, had worked himself up from a low class family. Eagle Scout, three-year varsity football player, and junior class president in high school; Superintendent's List at USAF Academy; one of the top ten graduates in his UPT class; known as an aggressive "hot stick" in his fighter squadron; recognized as "fearless" by his peers; was once reprimanded by his ops officer for delayed breakaway from target on a practice missile run. Promised his parents that he, his young wife, and child would be home for Christmas. Departed for parents' home in an Aeroclub aircraft on Christmas Eve. Ceiling of 1,000 feet. Forced down short of destination by bad weather. Departed airfield two hours later into a 500-foot ceiling. Impacted a 3,800-foot mountain at 3,500 feet. Three fatalities.

Research into accidents gives us a pretty clear message. Nurture and cultivate those dynamic personality traits that have helped you become a highly skilled aviator. But be aware of their limitations. Use your personality profile to become accident-conscious, not accident-prone.

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Coming Up: Your Last Chance!

The deadline for entering the MAC Flying Safety Writing Contest is 31 March. But you still have time to submit your entry if you hurry.

There are several things you should know before you decide NOT to enter the contest:

1. The first three winners will be presented engraved walnut desk sets.
2. Honorable mention winners will be awarded engraved plaques.
3. Each of the winning articles will be published, along with the author's photograph and biographical sketch, in THE MAC FLYER.
4. All winners will receive a year's personal subscription.
5. Your boss will be impressed with your talent, which never hurts around OER or APR time.
6. Your article could help prevent a crew member from getting into the kind of trouble none of us can afford.

Original, unpublished articles are what we're after. They should have a flying safety message and be six to 14 typewritten pages, double spaced. Mail to:

MAC Flying Safety Writing Contest
MAC/IGFE/Stop 114
Scott AFB IL 62225

Entries must be postmarked no later than 31 March 1976 and received on or before 7 April 1976.

Global Notes

lieutenants cited

First Lieutenants Binsford S. Luse, Jr., and Brian H. Peckham, of the 37th ARRS, F. E. Warren AFB, Wyo., have received Distinguished Individual Safety Awards for superior airmanship during an emergency in their UH-1F helicopter near Cheyenne, Wyoming.

The two were flying a convoy mission at 700 feet AGL when the engine on their helicopter failed. Lieutenant Luse, the aircraft commander, established autorotation; but at about 300 feet, both pilots saw that the area initially selected for landing was unacceptable due to its sloping terrain. They decided that a crosswind landing in a flat area was preferable to landing at the original site. Maneuvering the helicopter over a slight rise in the terrain by delaying the flare, Lieutenant Luse touched down with no damage to the helicopter.

Lieutenant Luse's quick evaluation of the situation and the assistance rendered by Lieutenant Peckham prevented an accident and possible injury to the crew and their one passenger.

viva MATS, er, MAC

Many of you older MAC crew members may find it hard to believe that 1 January 1976 marked the tenth year since the term "MAC" was first uttered in your outfit. As MATS became MAC, it was placed on the same level with other major U. S. Air Force combat commands. Simultaneously, other name changes occurred. The Eastern and Western Air Transport Forces (EASTAF and WESTAF) became 21 AF and 22 AF; Air Rescue Service became Aerospace Rescue and Recovery Service; and the Air Photographic and Charting Service was named Aerospace Audio-Visual Service.

How time flies.

15,000 safe hours

Seven MAC flight engineers have been awarded pins and patches commemorating their having attained 15,000 accident-free flying hours.

They are: MSgt Henry Adams, 30 MAS, McGuire AFB, N. J.; CMSgt Oliver P. Beals, 14 MAS, Norton AFB, Calif.; MSgt Jack W. Doney, 14 MAS, Norton AFB, Calif.; SMSgt Herbert N. Dorling, 8 MAS, McChord AFB, Wash.; MSgt Donald R. Hanon, 313 MAS (Assoc), McChord AFB, Wash.; CMSgt James J. Langdon, 20 MAS, Charleston AFB, S. C.; and SMSgt Leroy D. Thompson, 15 MAS, Norton AFB, Calif.

broken record

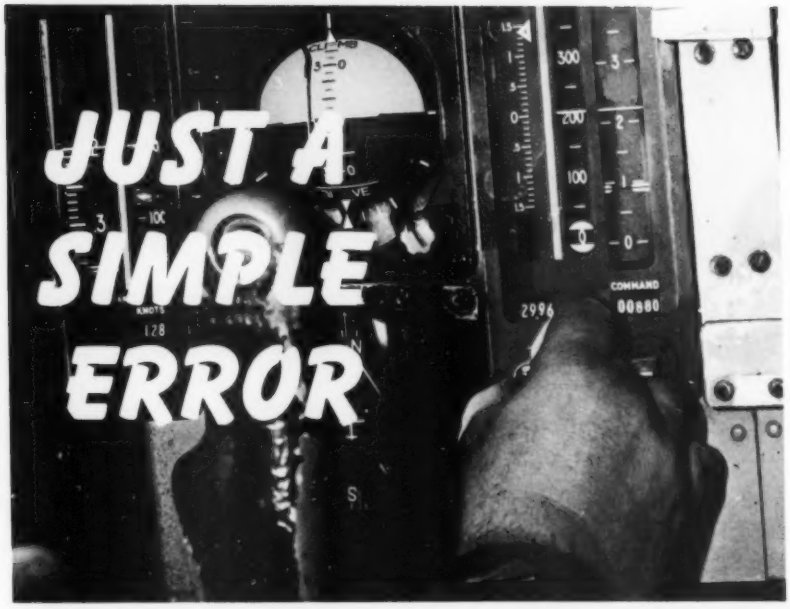
Records are made to be broken, or so the old saying goes. In line with that attitude, the 437th Military Airlift Wing, Charleston AFB, S. C., has set a new 30-day launch reliability record with its 158th consecutive on-time takeoff. This tops the previous 30-day record of 114 set at Travis AFB in July 1974.

art director retires

TSgt Eugene Reece, art director of THE MAC FLYER, receives bound volumes of the magazine prior to his retirement in March. Making the presentation is Lt Col John W. Ray, supervising editor.

Sergeant Reece's artwork, illustrations, and creations have graced the pages of THE MAC FLYER for over six years (1966-1970 and 1973-1976). Sergeant Reece has been an Air Force illustrator for nearly 18 years and plans to put his talents to work in the civilian sphere. We might even see old C. R. Terror as a civilian.

Geno's personality will be missed both in the mag and around IG offices and our many readers are certain to miss his creative artwork. Goodbye and good luck, Geno.



A change in altimeter setting usually indicates a rise or fall in station pressure—but not always.

It was a simple error — the kind that is easier to make than to detect — one which, under slightly different circumstances, could have added new names to that melancholy list of accident fatalities.

A routine mission. The Starlifter crew, inbound to a northern base, received airfield information and an altimeter setting of 29.96. They were told to expect a precision radar approach.

The radar controller turned the aircraft onto final and in a few minutes began to descend it to the notamed decision height of 603 feet.

The C-141's altimeters indicated approximately 1,200 feet AGL when it broke out of the weather, well before the controller reported decision height. The subsequent landing was uneventful.

A routine mission? After landing, the aircraft commander noted his altimeter. It showed the aircraft more than 500 feet higher than field elevation. The pilot compared his altimeter setting with that of the tower. They were identical, so the tower operator contacted the base weather station to find out what was wrong. In a few minutes, the weather station observer provided the explanation: the altimeter setting was in error.

The aircraft commander very wisely submitted a USAF hazard report. Here's what investigators came up with.

The original error occurred when an OJT duty observer computed the station altimeter setting improperly. At the time of his computation, the millibar setting was 996. That should have computed to an altimeter setting of 29.41, but 29.96 was reported instead.

Prior to releasing the altimeter setting to aircrews, the trainee's trainer should have checked it for accuracy, but did not.

Tower personnel failed to question the erroneous altimeter setting, which should have been obvious to anyone who knew the field elevation. Apparently, the tower shift-change briefing was incomplete. A thorough discussion of the weather would have revealed the disparity between the 29.96 setting and the 29.41 altimeter setting that had been reported only an hour earlier.

RAPCON personnel, likewise, failed to recognize the obvious error. Finally, the aircrew failed to question the altimeter setting until after landing. The crew had been issued a setting of 29.41 via airways radio three hours prior to arrival, but none of the crew questioned the unusual pressure rise indicated by the 29.96 reading.

It doesn't stretch the imagination much to surmise what could have happened had this altimeter error occurred during an approach with ceiling and visibility at minimums — throwing in the possibility of a radar altimeter malfunction or none at all.

Ground support personnel usually provide excellent support for the flying mission, and this incident is certainly not representative of the support aircrews usually receive. But no one is infallible, as this incident clearly demonstrates.

Aircrew vigilance is often the last bastion of a crew's line of defense against disaster. Yes, we hear it again and again — the safety of an aircraft and crew is the aircraft commander's responsibility. We may not like it, but until error is deleted from the list of human characteristics, it remains one of those facts of life that we cannot afford to ignore.

The Terrorific Trio marched in perfect route-step toward the officers club.

"It's a beautiful day in the U. K.," C. R. pontificated. "Maybe I'll get my old friend Stoney Stonehenge to run me over to Coventry to pick up a frammus for my ailing 'E' Type."

"Gee, Boss, is your British racing car NORS again? I don't know that you can get a frammus in Coventry now," said Blinky. "I think they moved the factory."

"No matter, Masterful Magellan," C. R. offered. "The day won't be a total loss in that Stoney and I will hit the Godiva Pub, study the mural, and guzzle a Guinness or two. Ah, the life of an Air Force aviator . . ."

Sam nodded. "That's quite a drive — over to Coventry. You know we've got an eight o'clock go tomorrow. I'm kinda worn down, us having the duty last night. Maybe we should . . ."

"It's just a trainer, a boondoggle," C. R. snorted, "so don't get excited."

Sam and Blinky nodded reticently, but allowed as how they would take a practice nap just in case . . .

In a matter of minutes, C. R. and his friend, Stoney, were motoring toward Coventry.

* * *

"Stoney, may I draw your attention to those two lovelies," cooed the fun-loving, thrill seeker, now completely relaxed in the comfort of The Lady Godiva pub, "And it appears to me that the ladies are without male companionship."

"Right you are, C. R.," Stoney offered. "They're rare 'birds' indeed. Should we offer them the pleasure of our company — perhaps, a suitable libation?"

"Can't keep the Queen's loyal subjects waiting," said C. R., in his best Richard Burton accent.

The dynamic dyad rose and walked, with swagger, toward the smiling lasses.

"Excuse, mum. Perhaps you

C. R. goes looking for parts to fit his E-type Jaguar and ends up needing some bodywork on his E-type Hercules instead.

weren't aware that you're now in the company of two of the world's most famous aviators. This is Stoney Stonehenge, and I'm C. R. Terror." The Bald One's teeth glistened. ". . . Major, United United States Air Force, Military Airlift Command, World Traveler, International Playboy, World's Finest —"

"Yes, mates," she smiled demurely. "Won't you join us for a drink?"

* * *

"Majah Terrah, Majah Terrah!" the thick British voice filled C. R.'s BOQ room.

"Arrgh! Phooey! Saint Peter with a bloke accent!" C. R. bolted from his bed and tripped over a chair of contemporary military design.

"Majah Terrah! Majah Terrah!" Again the box on the wall blasted. The Field Grade Fumbler's pudgy fingers felt for the "call" button in the dark.

"Sir, merely depress the knob in the centre and communication will be established," directed the mysterious voice.

Finally C. R. found the right switch, pressed the button, composed himself, and said, "Terror, here."

"Yes, Sir, you've been alerted. Contact Foxtrot Squadron Operations for particulars."

"Ah, Roger, wilco, over and out," muttered the Magnificent Manipulator of Rudder and Elevators.

* * *

"Meaning no disrespect, Sir — but you look like you got hydraulic fluid seepage in your eyeballs," chortled Long Suffering Sam as they boarded the breadtruck and headed for the Hercules.

"Yes, Sammy, ole Stoney and I ran in to a couple of 'birds' at the Lady Godiva last night and we spent the evening discussing the sociological impact of Anglo-Saxon influence on the development of the Hamilton Standard air screw," C. R. rambled.

"Ah, right, Chief," said Sammy, winking at Blinky, who appeared a bit confused.

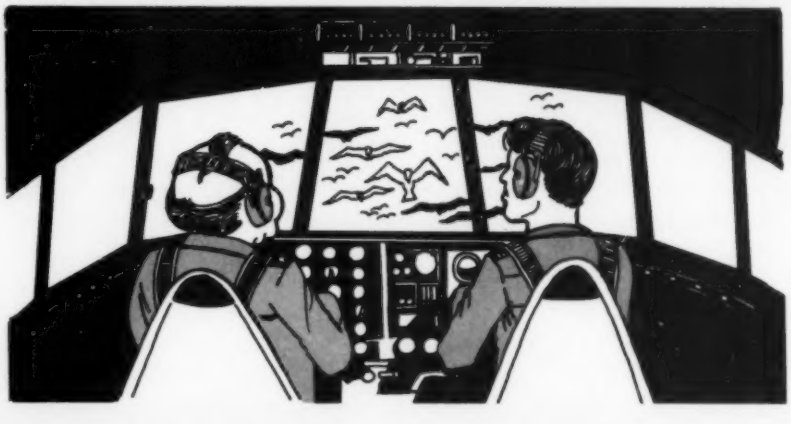
"Lovely birds, they were," C. R. said, clearing his throat. "Briefing today's mission, we'll play it strictly low key. Once airborne, Sammy, you take the controls and head us toward Coventry; Blinky, you'll supply the heading. About 20 miles out, wake me up and I'll do a modified LAPES maneuver over the cathedral. Hee! Hee! I promised the girls a little air show last night."

The sun was just beginning to rise on the U. K. as the MAC "fighter" taxied to the west end of the runway.

"Here we go again. Those tower twinkies are up to speed in their Crew Harrassment Program," C. R. complained. "Not a whisp of wind and they want the World's Finest to take off into a blazing sun. Oh, well, tell 'em we're ready."

"Sir, don't you think we oughtta pull a runup?" Sergeant Torque interrupted.

"C'mon, Max, you know that's for beginners. Gives them the feel of the throttles. Egor Allison and I discussed this back in '57 — he agreed with me that engine runups were totally unnecessary, wasteful, and shorten engine life," answered the Aviator with Avoir-



C.R. Terror

dupois. "Tell 'em we're ready to fling our craft through the footless halls of air, Sam. We can't keep the lovely birds waiting!"

"Sure, Boss," replied the able assistant to the Ancient Aeronaut. "Tower, Bravo Golf 007 ready to go."

"Roger, Bravo Golf, cleared for takeoff," tower responded. "Sir, be advised that a flock of gulls has been observed just past the departure end of runway zero nine. An immediate left turn after takeoff should keep you well clear."

"Roger, tower, understand advisory and cleared for takeoff," Sam responded as C. R. shoved the throttles to the stops.

As the C-130 passed 80 knots, C. R. noted, "See, Max, our prop jets are breathing properly, not a sign of hypoxia. We'll just keep this dude on the ground until Max Tire Rotate Speed and show those three-levels in the tower how the real pros do it."

"Hey, Boss, tower recommended an immediate left turn to avoid that flock," Sam reminded. "There they are! And they're coming toward us!"

"Easy, Sammy m'boy," said the Clever Clutcher of the Control Column, jerking back on the yoke. "Gear up, and cheer up, Number Two. If those quixotic quail choose to joust with my windmills, we'll leave a contrail of goosedown on the British countryside. Our feathered friends are no match for a steel steed!"

KaBump! KaBump! KaBump-bump!

"Yuk!" Sammy exclaimed as one of the bigger birds kamikazied the center of his windscreen.

"See, Sammy. We taught those birds a lesson," the Portly Pilot pointed out. "They'll never mess with . . ."

Max interrupted, "Sir, the r.p.m. on number one is dropping off and number two's TIT is fluctuating!"

"Shut down number one!" roared the Omnipotent One. "We'll give the gals a three-engine fly-by!"

"But, Sir," Sam pleaded, pulling number one T-handle. "We'd better get back; number two doesn't look too healthy."

"Number two's fluctuating out of limits," said Sergeant Torque, pointing at the TIT gauge.

"And stuff's coming out of the tailpipe," Ty Downs reported from the cargo compartment.

"We'll just featha the mutha," said C. R., reaching for number two condition lever.

"No! No!," cried Sam.

Too late. The Terrorific Teaser of Turboprops had succeeded in finding the Achilles heel of the powerful Hercules.

"No sweat, Sammy, when I used to fly slot with the Four Horsemen, two engine flybys were SOP. Tell tower we'll shoot a 'closed' and, ah, maybe you oughtta pull up the flaps; we must be heavier than I thought," C. R. surmised, fighting to get the Herk in some semblance of stable flight.

"Sir," Long Suffering Sam declared. "With one and two not putting out, we don't have the hydraulics to get the flaps up."

Beads of perspiration appeared on C. R.'s furrowed forehead as his weakened machine continued its descending left turn.

"Sir, we better crank up number two and — " Sammy started.

"Nonsense, m'boy — if you'd paid attention, you would have noticed that I have adroitly positioned our Lockheed Legend on a modified downwind, turning

base even," C. R. asserted and the Hercules continued its semi-controlled left turn.

"But the gear, Sir! What about the gear?" Sam importuned.

"Er, ah right, Sammy. By all means, put the gear down!" shouted C. R., noting the runway was dead ahead. "We've got it made!"

"Oh, no!" Sammy almost weeped. "You know we can't get the gear down, any more than we could get the flaps up. We're gonna crash!"

"Foam the runway! Declare an emergency!" C. R. commanded in a shrill voice. "Call out the crash crew!"

In a last ditch attempt, C. R. punched forward on the controls, rolled wings level, and chopped the power on three and four. The big bird touched down in the wet grass beside runway zero nine, skipped into the air, and settled back to terra firma, plowing a muddy furrow across the infield.

"Abandon ship!" C. R. directed as the Herky came to rest, slightly nose down in a drainage ditch crossing the airfield.

The Paunchus Pilot exited to find his crew white with fright and somewhat comatose.

* * *

C. R. joined Sam and Blinky at the bar in time for Attitude Adjustment Hour.

"Hey, Boss, you're looking pretty good!" Sammy ventured. "When I think of how lucky we were . . . What did the brass have to say?"

"Luck?! Sammy, I can see that it'll be awhile before you upgrade. Even those colonels realized that, blinded by the sun, I could not see that bevy of quail. They even commended me for having the wits to affect a gear-up on the wet infield, thereby minimizing the damage to our wounded airwagon," C. R. hyperbolated, ordering a very dry martini and quickly changing the topic.

Blinky decided not to pursue the touchy subject. Noting a pair of sweet young things who had entered the club, offered, "Hey, Chief, there's a couple of fine looking 'birds'."

Without looking up, C. R. mused, "Forget it, Blinky. I don't ever want to hear that word again."

Quick Stoppers

Who Said 13 Is Unlucky?

A couple of CH-3E instructor pilots set out on an autorotation training mission to sharpen their proficiency. One pilot flew five consecutive autorotations to a taxiway and then began alternating autorotations with the other pilot. On the thirteenth approach, the pilot initiated the flare at 150 feet but the rate of descent didn't decrease as expected. Realizing that he was too low, the pilot called for speed selectors and began recovery as the engines responded. But before he could recover from the chopper's 15 to 18 degree nose-high attitude, the tail rotor contacted terra firma. Unaware of any connection between the "clunk" he heard and the tail rotor contact, the pilot continued the recovery. But then, as it moved forward just ten feet above the taxiway, the helicopter developed a right yaw. The crew landed and shut down the helicopter.

Inspection revealed five wiped-out tail rotor blades, a cracked intermediate gearbox case, gearbox cowling damaged beyond repair, and shrapnel damage to other aircraft surfaces. The most likely cause of $7,500 worth of damage was insufficient airspeed during the flare and delayed power-off recovery.

Fatal Fall

As the C-5 stopped short of the runway for a brake check, two crewmen attempted to open the stubborn crew entrance door. One manipulated the hydraulic controls; the other, perched on the flight deck entrance ladder, pried the cross linkage above the faulty door. When the hydraulic door locks released, the door opened two to three inches and then appeared to fall to the full open position. The crewman prying on the linkage apparently got his foot caught in the opening door, lost his balance, and fell to the ground. He suffered a fractured skull and remained on the critical list for nearly a week before he died. The hazards associated with working around doors and hatches cannot be overemphasized.

"Lots of Times..."

Although spring is just around the corner, it's still snowin' and blowin' in many parts of the country. Whether it's December or March, inadequate cold weather preflight preparation can spell big trouble. During one recent wintry takeoff, a light aircraft stalled and crashed. Inspection of the wreckage two hours after the accident revealed the upper wing surfaces, ailerons, horizontal stabilizer, and elevators completely covered with a jagged layer of ice from one-fourth to one-half inch in thickness. The civilian pilot stated that he preflighted the aircraft and noted ice and snow on the wing and tail surfaces, but he "didn't do anything about it." He also stated that he had taken off "lots of times" with ice on the wings.

Rushing Roulette

Following completion of two night low level routes, one of the Herky birds in the formation landed to deplane both navigators before continuing as a night pilot proficiency mission. Not long after takeoff, a fog bank rolled in and quickly obscured the primary instrument runway. The pilot requested radar vectors to the opposite runway and planned to make a visual approach to a full stop landing, even though the field was actually below minimums. Approximately three miles from touchdown, the aircraft suddenly slashed through some treetops. The pilot abruptly pulled back on the yoke and resumed a normal descent to an uneventful landing. The crew lucked out — dents and scratches on the right external tank and horizontal stabilizer, and prop damage. A few feet lower and it would have been a different matter.

Check the Wiring Too!

A T-39 was minutes away from touchdown when the cockpit suddenly filled with smoke and fumes. Both pilots quickly donned their oxygen masks and declared an emergency. After this transmission, the interphone system went bonkers. Neither pilot could transmit internally or externally with the masks on. In spite of smoke problems and crew coordination difficulties, the aircraft commander hustled his Sabreliner through a VFR approach and landing without further hassle. The source of all the heartburn was traced to an electrical short in the ice-check light switch. A loose microphone plug in the copilots mask apparently had caused the interphone system to malfunction. A pretty good reason for crewmembers to thoroughly check their quick-donning plumbing and wiring before joining the tumbling mirth of sunsplit clouds.

What Will They Find Next?

The original aircraft historical data for the C-130's number two propeller had been lost. A new form was prepared at depot indicating that the prop had logged over 1,500 hours since last overhaul. Since this figure exceeded inspection cycles, the prop was removed for complete teardown and inspection. During the teardown, inspectors found a cloth bag containing nearly half a pound of miscellaneous small prop parts stuck inside the hollow blade shank of the number three blade. What will they find next?

Another Close Call

A MAC transport crew awaited clearance to cross the active runway following the formation takeoff of two fighters. As the fighters began their takeoff, formation lead announced to tower that the number two aircraft was aborting and that lead would continue takeoff. The tower controller directed the wingman to turn off the active and simultaneously cleared the MAC aircraft across the runway. As the MAC crew began taxiing across, they spotted the "aborted" fighter approaching them, apparently at high power. The MAC pilot applied brakes and stopped his aircraft just short of the runway as the fighter roared past. Although the tower operator gave a belated warning, only crew alertness prevented certain disaster.

This is a good reminder for crews to keep their heads on a swivel and eyes looking when maneuvering on, across, or in close proximity to an active runway.

QS

Charbroiled

One T-39 driver apparently got his favorite T-bone steak recipe confused with his J-60 Pratt & Whitney. While starting number one, he noted engine r.p.m. hanging up around 25 percent. Suspecting a malfunctioning gauge, he tapped it. But elsewhere on the center instrument panel, the EGT gauge was telling a story of its own. By the time the rapid EGT rise caught the pilot's attention, the indicator was passing 800 degrees C. Outside, the engine blowtorched six to 12 inch flames out the tailpipe. The pilot stopcocked the ailing engine in short order but not before the temperature had shot up to 875 degrees C. Remember, the Dash One limits starting EGT to 525 degrees C and recommends shutdown at 475 degrees C if the EGT is rising rapidly.

Sparks in the Cockpit

While cruising along at 27,000 feet, the pilot of a KC-135 spotted a sizzling electrical display behind his seat. Another crew member quickly began checking the wiring in the area, but when he touched one of the wires leading to the window heat, a brilliant spark severed the cord. Window heat was turned off and associated circuit breakers pulled. Postflight investigators discovered a chafed wire that had been repaired with common electrician's tape. Maintenance personnel are reminded that using such tape to repair frayed aircraft wires is a no-no.

Fairway Freeze

A pilot of a Lear jet waited approximately an hour for his ATC clearance during intermittent heavy snow showers. As the aircraft taxied to the active, one witness noted that it was covered with approximately one and a half inches of wet snow. As the jet approached rotation speed during takeoff, the pilot realized that rotation was not normal. Suspecting that snow had frozen to the metal, he aborted and called for the drag chute. But poor braking action and drag chute failure helped the slick biz-jet breach a runway boundary fence and knock out some runway lighting before coming to rest on a golf course.

Investigators cited inadequate preflight preparation and planning as the probable cause.

after deadline . . .

BICENTENNIAL -- We're planning to commemorate the Bicentennial in THE MAC FLYER during 1976. We need photos, stories, or other memorabilia out of the MAC/MATS past. If you can help, write or call Autovon 638-3534/5542.

HOW MANY COPIES -- of THE MAC FLYER is your unit receiving? The money crunch continues and the staff is taking a close look at distribution lists to see where a savings can be made -- without affecting the MAC mission, of course. We want you to receive enough copies, but we need the help of commanders and safety officers to review distribution requirements to be sure you're not receiving too many already. Flying units should receive a maximum of one copy per every five crew members -- unless you can get along comfortably with fewer. Units in direct support of the flying mission should be receiving not more than one per every 20 support persons. Other units and agencies should review requirements and cut back to a minimum. Use AF Form 764A to reduce requirements.

COMING UP NEXT MONTH --

* A veteran navigator tells how he almost snatched defeat from the jaws of victory by directing his Herk into the heart of a cumulonimbus in "Sunday Afternoon Cu."

* If you've been wondering why ARTC controllers have almost stopped bugging you to change transponder codes, you'll be interested in a feature that discusses a couple of recent FAA innovations that benefit pilots.

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Touch 'n Go